

REMARKS

Claims 22-33 were pending. Claims 22 and 28 have been amended for clarity. Claims 40 and 41 are new. Claims 22-33 and 40-41 are pending.

Claims 22-33 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,709,874 to Ning. Applicant respectfully requests reconsideration of this rejection.

Claim 22 recites an MRAM structure that includes “an insulating layer,” “a planarized barrier layer disposed over the insulating layer,” a “plurality of longitudinally extending planarized conductive lines formed over said barrier layer,” “respective first magnetic layers over said conductive lines,” “respective second magnetic layers over said first magnetic layers,” and “a planarized conductive material layer formed between said planarized conductive lines and said barrier layer, and said first magnetic layers.”

Ning discloses an MRAM structure in which upper portions of conductive material formed in barrier-lined trenches is removed to form recesses. A metal cap layer is formed in the recesses. The metal cap is not formed “over” the “barrier layer” as in recited claim 22. Ning does not anticipate claim 22.

Claim 22 is patentable over Ning. Claims 23-27 depend directly from claim 22 and are patentable over Ning for at least the same reasons.

Claim 28 recites a memory device that includes “at least one magnetic random access memory cell.” The magnetic random access memory cell includes “an insulating layer,” “a planarized barrier layer formed over the insulating layer,” “a planarized conductor formed over the planarized barrier layer,” “a first ferromagnetic layer formed over said planarized conductor,” “a second ferromagnetic layer formed

over said first ferromagnetic layer," "a nonmagnetic layer between said first and second ferromagnetic layers," and "a planarized conductive material layer provided between said planarized conductor and said planarized barrier layer, and said first ferromagnetic layer."

Ning discloses that a memory device in which a conductive metal cap is formed in a recess formed in a conductive layer. Ning does not teach a memory device with at least one magnetic random access memory cell that has "a planarized barrier layer formed over [an] insulating layer," a "planarized conductor formed over the planarized barrier layer," and "a planarized conductive material layer provided between said planarized conductor and said planarized barrier layer."

Claim 28 is patentable over Ning. Claims 29-33 depend directly from claim 28 and are patentable over Ning for at least the same reasons.

Claims 22, 25, 27-28, 31, and 33 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,555,858 to Jones et al. Applicant respectfully requests reconsideration of this rejection.

Claim 22 recites an MRAM structure that includes "a planarized barrier layer" disposed over an insulating layer, a "plurality of longitudinally extending planarized conductive lines formed over said barrier layer," and "a planarized conductive material layer formed between said planarized conductive lines and said barrier layer," and first magnetic layers "formed over said conductive lines."

Jones et al. discloses an MRAM structure in which a dielectric layer 230 is formed over barrier layers 226. Conductive layer 232 is formed over the dielectric layer 230. Jones et al. does not disclose an MRAM structure with "a planarized conductive

material layer formed between...planarized conductive lines and [a] barrier layer,” and first magnetic layers “formed over said conductive lines.”

Claim 22 is patentable over Jones et al. Claims 25 and 27 depend directly from claim 22 and are patentable over Jones et al. for at least the same reasons.

Claim 28 recites a memory device that includes an MRAM cell having a “planarized barrier layer” formed over an insulating layer and “a planarized conductor formed over the planarized barrier layer.” A planarized conductive material layer is “provided between said planarized conductor and said planarized barrier layer,” and a first ferromagnetic layer “formed over said planarized conductor.”

Jones et al. discloses a memory device featuring dielectric layer 230 formed over barrier layers 236. Jones et al. does not disclose a memory device with an MRAM cell that has “a planarized conductive material layer provided between said planarized conductor and said planarized barrier layer,” and a first ferromagnetic layer “formed over said planarized conductor.”

Claim 28 is patentable over Jones et al. Claims 31 and 33 depend from claim 28 and are patentable over Jones et al. for at least the same reasons.

Claims 22-33 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 43-67 of copending U.S. Pat. Appl. No. 10/196,933. Applicant will address the rejection when it is no longer provisional.

Claims 23-24, 26, 29-30, and 32 stand rejected under 35 U.S.C. § 103 as being unpatentable over Jones et al. in view of Ning. Applicant respectfully requests reconsideration of this rejection.

Claims 23, 24, and 26 depend directly from claim 22. Claim 22 is patentable over Jones et al. as advanced above. Claim 22 also is patentable over Ning. Ning does not remedy the deficiencies of Jones et al. Ning has been cited as providing thickness ranges and materials missing from Jones. Even if Jones et al. and Ning were combined, the result would be an MRAM structure in which a portion of conductor 228 is removed to provide a recess for conductive layer 232. Ning does not combine with Jones to provide an MRAM structure with “a planarized conductive material layer formed between...planarized conductive lines and [a] barrier layer,” and first magnetic layers “formed over said conductive lines.”

Claim 22 is patentable over Jones et al. in view of Ning. Claims 23, 24, and 26 depend from claim 22 and are patentable over Jones et al. in view of Ning for at least the same reasons.

Claims 29, 30, and 32 depend directly from claim 28. Claim 28 is patentable over Jones et al. as advanced above. Claim 28 also is patentable over Ning. Ning does not remedy the deficiencies of Jones et al. Ning has been cited to provide thickness ranges and materials missing from Jones et al. Even if Jones et al. and Ning were combined, the result would be a memory device in which a portion of conductor 228 is removed to provide a recess for conductive layer 232. Ning does not combine with Jones et al. to provide a memory device with a planarized conductive material layer is “provided between said planarized conductor and said planarized barrier layer,” and a first ferromagnetic layer “formed over said planarized conductor.”

Claim 28 is patentable over Jones et al. in view of Ning. Claims 29, 30, and 32 are patentable over Jones et al. in view of Ning for at least the same reasons.

New claims 40 and 41 depend from claims 22 and 28 respectively, which are patentable over the cited prior art as advanced above. Claims 40 and 41 are patentable over the cited prior art for at least the same reasons.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: September 16, 2005

Respectfully submitted,

By 

Thomas J. D'Amico

Registration No.: 28,371

DICKSTEIN SHAPIRO MORIN &

OSHINSKY LLP

2101 L Street NW

Washington, DC 20037-1526

(202) 785-9700

Attorney for Applicant